

**CITY OF DUBOIS** **(PWS 7170003)**  
**SOURCE WATER ASSESSMENT FINAL REPORT**

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**November 20, 2002**



**State of Idaho**  
**Department of Environmental Quality**

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## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for the City of Dubois, Idaho* describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in another category(ies) results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential contaminants are divided into four categories, inorganic chemical (IOC, i.e. nitrates, arsenic) contaminants, volatile organic chemical (VOC, i.e. petroleum products) contaminants, synthetic organic chemical (SOC, i.e. pesticides) contaminants, and microbial contaminants (i.e. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

The City of Dubois public water system (PWS 7170003) consists of three ground water sources. Well #1 and Well #2 have an overall moderate susceptibility rating for IOCs, VOCs, SOCs and microbials. Well #3 has an overall high susceptibility to IOCs and VOCs, and a moderate susceptibility to SOCs and microbial contaminants.

No VOCs or SOCs have been detected for any of the wells. Total coliform bacteria were detected in the distribution system in November 1995, but no confirmed detections have ever been located at any of the wellheads. Well #1 has recorded the presence of fluoride, but at levels below the maximum contaminant level (MCL) set by EPA. Well #2 has recorded the presence of fluoride and chromium at levels below their MCLs. Well #3 has recorded the presence of beryllium, cadmium, chromium, and fluoride at level below their respective MCLs. In addition, each of the wells has recorded the presence of nitrate, but at the natural background conditions of less than 1.0 milligrams per liter (mg/L). The MCL for nitrate is 10.0 mg/L.

Each of the delineations for the three city wells encompasses slightly different corridors that extend to the northeast of Dubois. The hydrologic sensitivity of the aquifer for all of the wells is high due to the fractured basalt and lack of retarding layers between basalt flows. The potential land use assessment for the wells rates moderate for IOCs, VOCs, and SOCs, and low for microbial contaminants. Another factor is the well construction score, which rates moderate susceptibility for all three wells. Although there are only a few potential contaminant sources for all three wells, Well #2 (also referred to as the Railroad Well) is very close to the railroad corridor and therefore particularly vulnerable to any spill that may occur from that source.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

For the City of Dubois, drinking water protection activities should focus on correcting deficiencies outlined in the 1998 Sanitary Survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system’s components and its capacity). Any spills from the potential contaminant sources listed in Appendix A should be carefully monitored, as should any future development in the delineation areas. Other practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas should be implemented. Any new construction should conform to current regulations and should consider a depth that puts the producing zone below the sedimentary interbeds that are encountered between 400 and 600 feet below ground surface. Since most of the designated areas are outside the direct jurisdiction of the City of Dubois, partnerships with state and local agencies and industry groups should be established. These collaborative efforts are critical to the success of drinking water protection. Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

# SOURCE WATER ASSESSMENT FOR THE CITY OF DUBOIS, IDAHO

## Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings, used to develop this assessment, is also attached.

### Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of this assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

## **Section 2. Conducting the Assessment**

### **General Description of the Source Water Quality**

The City of Dubois public drinking water system consists of three ground water sources. The system serves approximately 300 people with about 219 connections, and is located in Clark County (Figure 1).

No VOCs or SOCs have been detected for any of the wells. Total coliform bacteria were detected in the distribution system in November 1995, but no confirmed detections have ever been located at any of the wellheads. Well #1 has recorded the presence of fluoride, but at levels below the MCL set by EPA. Well #2 has recorded the presence of fluoride and chromium at levels below their MCLs. Well #3 has recorded the presence of beryllium, cadmium, chromium, and fluoride at level below their respective MCLs. In addition, each of the wells has recorded the presence of nitrate, but at the natural background conditions of less than 1.0 mg/L. The MCL for nitrate is 10.0 mg/L.

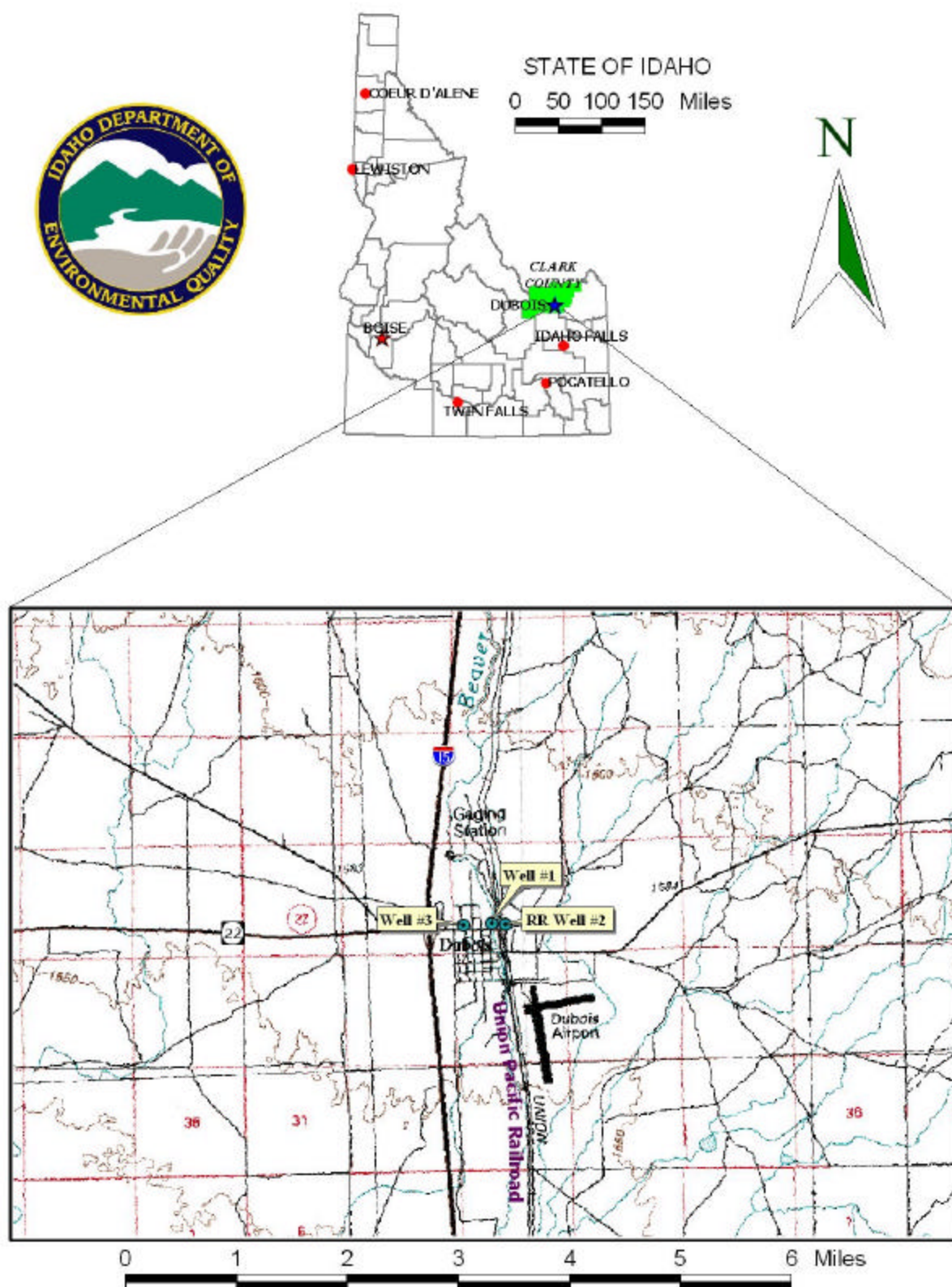
### **Defining the Zones of Contribution – Delineation**

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ contracted with Washington Group, International (WGI) to perform the delineations using a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Eastern Snake River Plain (ESRP) aquifer in the vicinity of the City of Dubois. The computer model used site-specific data, assimilated by WGI from a variety of sources including local area well logs, operator provided information, and hydrogeologic reports (detailed below).

The Snake River Plain Aquifer is a northeast trending basin located in eastern Idaho. Ten thousand square miles of the basin are primarily filled with highly fractured layered Quaternary basalt flows of the Snake River Group, which are intercalated with terrestrial and lacustrine (lake deposited) sediments along the margins (Garabedian, 1992, p. 5). Individual basalt flows range from 10 to 50 feet in thickness and average 20 to 25 feet (Lindholm, 1996, p. 14). Basalt is thickest in the central part of the eastern plain and thins toward the margins. Whitehead (1992, p. 9) estimates the total thickness of the flows to be as great as 5,000 feet. A thin layer (0 to 100 feet) of windblown and fluvial sediments overlies the basalt.

The plain is bounded to the east by rocks of the Yellowstone Group (mainly rhyolite) and Idavada Volcanics to the southwest. The Snake River flows along part of the southern boundary and is the only drainage that leaves the plain. Rivers and streams entering the plain from the south are tributary to the Snake River. Rivers entering from the north vanish into the highly transmissive basalts of the Snake River Plain Aquifer.

**FIGURE 1 - Geographic Location of the City of Dubois**



The layered basalts of the Snake River Group host one of the most productive aquifers in the United States. The aquifer is generally considered unconfined, yet it may be confined locally because of interbedded clay and dense, unfractured basalt (Whitehead, 1992, p. 26). Whitehead (1992, p. 22) reports that well yields of 2,000 to 3,000 gal/min are common for wells open to less than 100 feet of the aquifer. Lindholm (1996, p. 18) estimates aquifer thickness to range from several hundred feet near the plain's margin to thousands of feet near the center.

The majority of aquifer recharge results from surface water irrigation activities (incidental recharge), which divert water from the Snake River and its tributaries (Ackerman, 1995, p. 4, and Garabedian, 1992, p. 11). Natural recharge occurs through stream losses, direct precipitation, and tributary basin underflow.

Regional ground water flow is to the southwest paralleling the basin (Cosgrove et al., 1999, p. 21; deSonneville, 1972, p. 78; Garabedian, 1992, p. 48; and Lindholm, 1996, p. 23). Ground water flow direction at the local scale is thought to be highly variable due to preferential flow paths through the fractured and layered basalts.

The delineated source water assessment areas for Wells #1, #2, and #3 extend to the northeast and are about 4,000 feet long and 2,000 feet wide (Figures 2, 3, and 4 in Appendix A). The actual data used by WGI in determining the source water assessment delineation areas are available from DEQ upon request.

### **Identifying Potential Sources of Contamination**

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and the City of Dubois and from available databases.

The dominant land use outside the City of Dubois is non-irrigated agricultural land. Land use within the immediate area of the wells consists of urban, commercial, and industrial land uses and the Union Pacific Railroad.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

## **Contaminant Source Inventory Process**

A contaminant inventory of the study area was conducted in the summer of 2001. This involved identifying and documenting potential contaminant sources within the City of Dubois Source Water Assessment Areas through the use of computer databases and Geographic Information System maps developed by DEQ. In June 2001, the City of Dubois was asked to conduct an enhanced potential contaminant inventory to verify the current list and to possibly identify additional potential sources of contamination.

Since the delineations differ from one another, the potential contaminant sites located within each of the delineated source water areas differ. Descriptions of the sites and the locations relative to the sources are found in Tables 2 through 4 and Figures 2 through 4 in appendix A. The number of potential contaminant sites ranges from three (Wells #1 & #3) to two (Well #2). These sites include an aboveground storage tank (AST) site, the Union Pacific Railroad, and Highway 22. If an accidental spill occurred along either of these corridors, IOCs, VOCs, SOCs, or microbial contaminants could be added to the aquifer.

## **Section 3. Susceptibility Analyses**

Each well's susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix B contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

### **Hydrologic Sensitivity**

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

The hydrologic sensitivity rating is high for all three wells (see Table 1). This reflects the moderate to well-drained nature of the soil within the delineated areas, a vadose zone composed of gravel and fractured basalt, and the lack of thick fine-grained layers retarding the downward movement of contaminants.



## Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in sanitary surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

The City of Dubois drinking water system consists of three wells that extract ground water for community, commercial, recreational, and industrial uses. All three wells score at moderate susceptibility for system construction. There is no indication that the wells' casings are seated in low permeability geologic units and there is insufficient information for DEQ to determine if current well construction standards were being met. All three wells are located near the middle of the town of Dubois with Well #2 located adjacent to the Union Pacific Railroad.

The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all Public Water Systems (PWSs) to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the requirements include casing thicknesses, well tests, and depth and formation type that the surface seal must be installed into. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Eight-inch diameter wells require a casing thickness of 0.322-inches, ten-inch diameter wells require a casing thickness of 0.365-inches, and twelve-inch diameter wells and above require a casing thickness of 0.375-inches. Pump tests for wells producing greater than 50 gpm require a minimum of a 6-hour test.

## Potential Contaminant Source and Land Use

Due to substantial potential urban land use and transportation corridors, particularly with Well #2's close proximity to the Union Pacific Railroad, all the wells rate moderate susceptibility for IOC's (nitrate), VOCs (i.e. petroleum products), and SOC's (i.e. pesticides). All three wells have a low land use score for microbial contamination.

## Final Susceptibility Rating

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a confirmed detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well, despite the land use of the area, because a pathway for contamination already exists. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year TOT zone (Zone 1B) and much agricultural land contribute greatly to the overall ranking. In terms of total susceptibility, all three wells rate moderate susceptibility for IOC's, VOC's, SOC's, and microbial contamination (see Table 1 & Appendix B).

**Table 1. Summary of the City of Dubois' Susceptibility Evaluation**

Source	Susceptibility Scores <sup>1</sup>									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	H	M	M	M	L	M	M	M	M	M
Well #2	H	M	M	M	L	M	M	M	M	M
Well #3	H	M	M	M	L	M	H	H	M	M

<sup>1</sup>H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

### Susceptibility Summary

In terms of total susceptibility, (right side of Table 1) Well #1 and #2, rate moderate susceptibility in all four categories. Well #3 rates high for IOCs and VOCs, and moderate for SOC and microbial contaminants. Wells #1 and #2 do not have well logs that could reveal important information regarding geology and other well conditions, which makes the scores conservative. Furthermore, the delineation zones for both of these wells are located in areas with only two potential contaminant sources.

Despite the moderate to high susceptibility ratings for the City of Dubois, the city continues to provide high quality water to its citizens. No VOCs or SOC have been detected for any of the wells. Total coliform bacteria were detected in the distribution system in November 1995, but no confirmed detections have ever been located at any of the wellheads. Well #1 has recorded the presence of fluoride, but at levels below the MCL set by EPA. Well #2 has recorded the presence of fluoride and chromium at levels below their MCLs. Well #3 has recorded the presence of beryllium, cadmium, chromium, and fluoride at level below their respective MCLs. In addition, each of the wells has recorded the presence of nitrate, but at the natural background conditions of less than 1.0 mg/L. The MCL for nitrate is 10.0 mg/L. Despite the high quality of water currently being provided, the City of Dubois should be aware of the possibility of future contamination from potential contaminant sources and from continued agricultural practices.

## Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For the City of Dubois, drinking water protection activities should focus on correcting deficiencies outlined in the 1998 Sanitary Survey. Any spills from the potential contaminant sources described in Appendix A should be carefully monitored, as should any future development in the delineation areas. Other practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas should be implemented. Since the deeper Well #3 has a lower potential of contamination, the City of Dubois could consider pumping more water from this well. Any new PWS well should meet the *Recommended Standards for Water Works* (1997) as outlined in IDAPA 37.03.09 and IDAPA 58.01.08.550. Since most of the designated areas are outside the direct jurisdiction of the City of Dubois, partnerships with state and local agencies and industry groups should be established. These collaborative efforts are critical to the success of source water protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near urban and residential land uses areas. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. There are transportation corridors near the delineations, therefore the Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A community must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Idaho Falls Regional Office of the DEQ or the Idaho Rural Water Association.

## **Assistance**

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Idaho Falls Regional DEQ Office (208) 528-2650

State DEQ Office (208) 373-0502

Website: [www.deq.state.id.us](http://www.deq.state.id.us)

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper, Idaho Rural Water Association, at 208-343-7001 ([mlharper@idahoruralwater.com](mailto:mlharper@idahoruralwater.com)) for assistance with drinking water protection (formerly wellhead protection) strategies.

## References Cited

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- Whitehead, R.L., 1992, Geohydrological Framework of the Snake River Plain Regional Aquifer System, Idaho and Eastern Oregon, U.S. Geological Survey Professional Paper 1408-B, I-FY92, 32 p.

## POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

**AST (Aboveground Storage Tanks)** – Sites with aboveground storage tanks.

**Business Mailing List** – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS** – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site** – DEQ permitted and known historical sites/facilities using cyanide.

**Dairy** – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well** – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

**Floodplain** – This is a coverage of the 100-year floodplains.

**Group 1 Sites** – These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area** – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

**Landfill** – Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area** – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

**NPDES (National Pollutant Discharge Elimination System)** – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas** – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

**Recharge Point** – This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RICRIS** – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities)** – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI)** – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank)** – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

**Wellheads** – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

# Appendix A

## City of Dubois Delineation Figures and Potential Contaminant Tables

**Table A-1. Well #1, Potential Contaminant Inventory**

Site #	Source Description <sup>1</sup>	TOT ZONE <sup>2</sup>	Source of Information	Potential Contaminants <sup>3</sup>
1	Oil Company (AST)	0 - 3	Database Search	IOC, VOC, SOC
	Highway 22	0 - 10	GIS Map	IOC, VOC, SOC, M
	Railroad	0 - 10	GIS Map	IOC, VOC, SOC, M

<sup>1</sup> AST = Aboveground Storage Tank

<sup>2</sup> TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

<sup>3</sup> IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical, M= microbial

**Table A-2. Well #2, Potential Contaminant Inventory**

Site #	Source Description <sup>1</sup>	TOT ZONE <sup>2</sup>	Source of Information	Potential Contaminants <sup>3</sup>
	Farm	0 - 3	Enhanced Search	IOC, VOC, SOC, M
	Railroad	0 - 6	GIS Map	IOC, VOC, SOC, M

<sup>2</sup> TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

<sup>3</sup> IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical, M= microbial

**Table A-3. Well #3, Potential Contaminant Inventory**

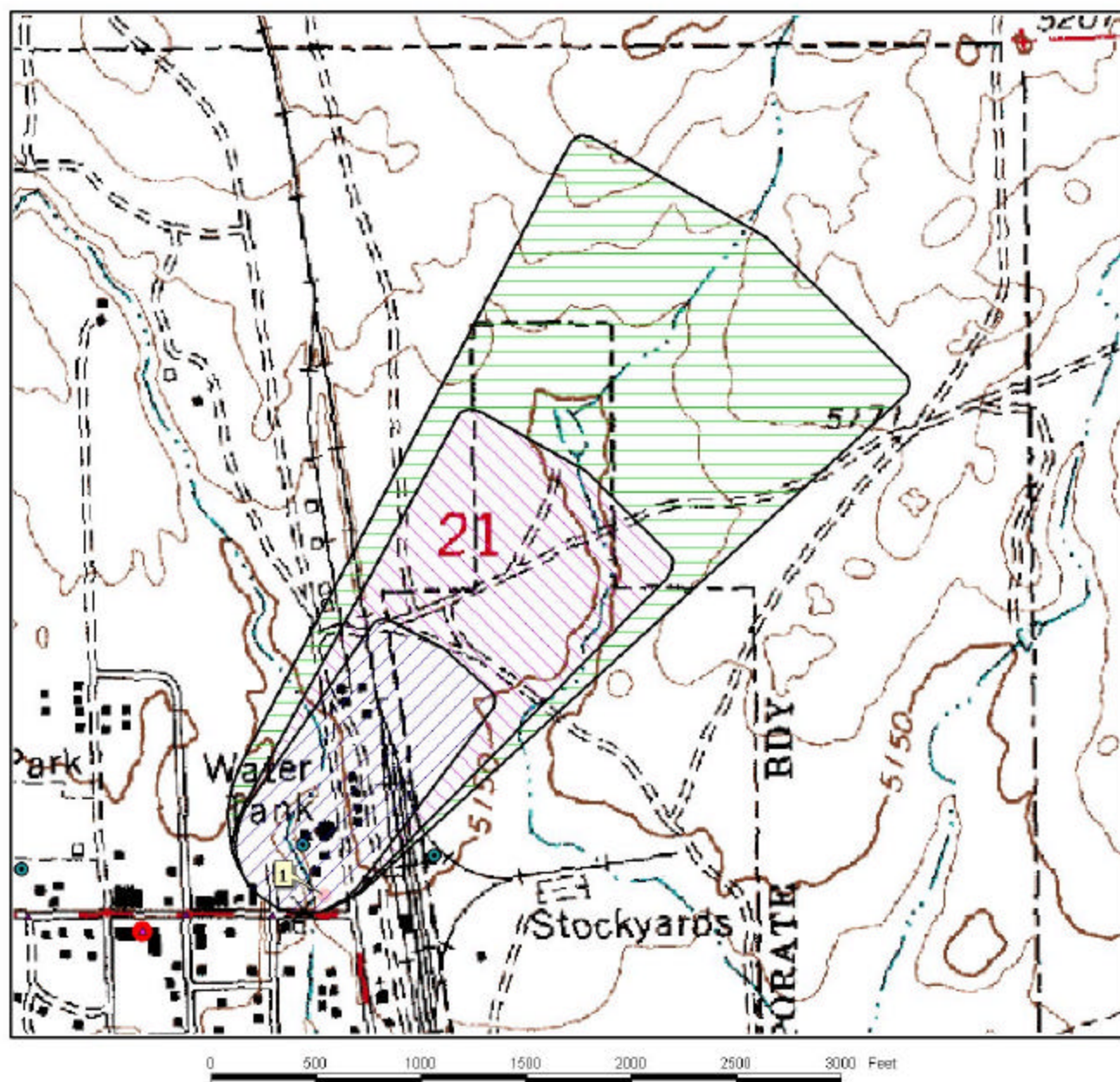
Site #	Source Description <sup>1</sup>	TOT ZONE <sup>2</sup>	Source of Information	Potential Contaminants <sup>3</sup>
1	UST Site	0 - 3	Database Search	IOC, VOC, SOC
	Highway 22	0 - 3	GIS Map	IOC, VOC, SOC, M
	Railroad	3 - 10	GIS Map	IOC, VOC, SOC

<sup>1</sup> UST = underground storage tank, NPDES = National Pollutant Discharge Elimination System, SARA = Superfund Amendments and Reauthorization Act, WLAP = wastewater land application,

<sup>2</sup> TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

<sup>3</sup> IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical, M= microbial

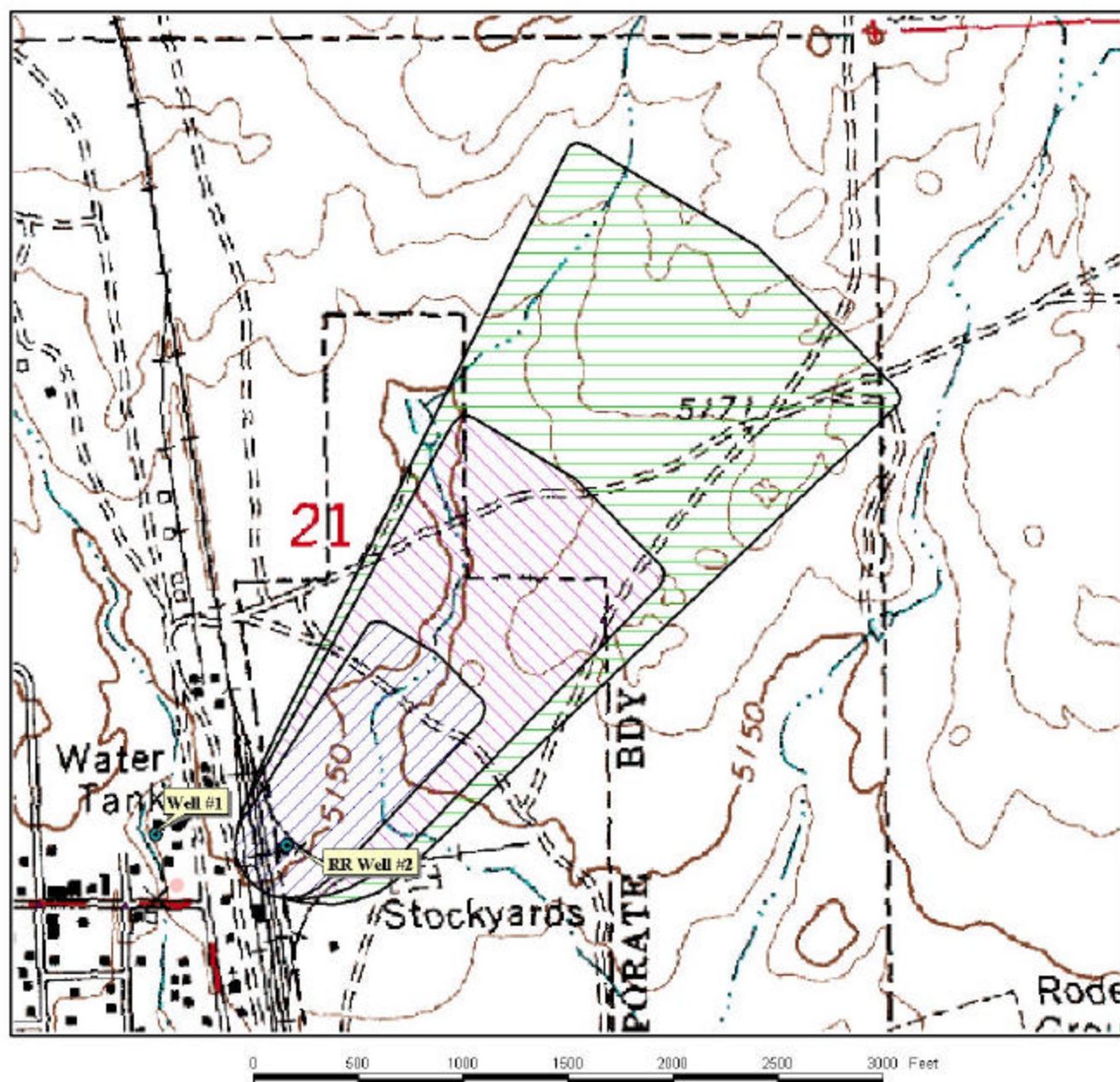
**FIGURE 2 - City of Dubois Delineation Map and Potential Contaminant Source Locations**



**PWS# 7170003**  
**Well #1**



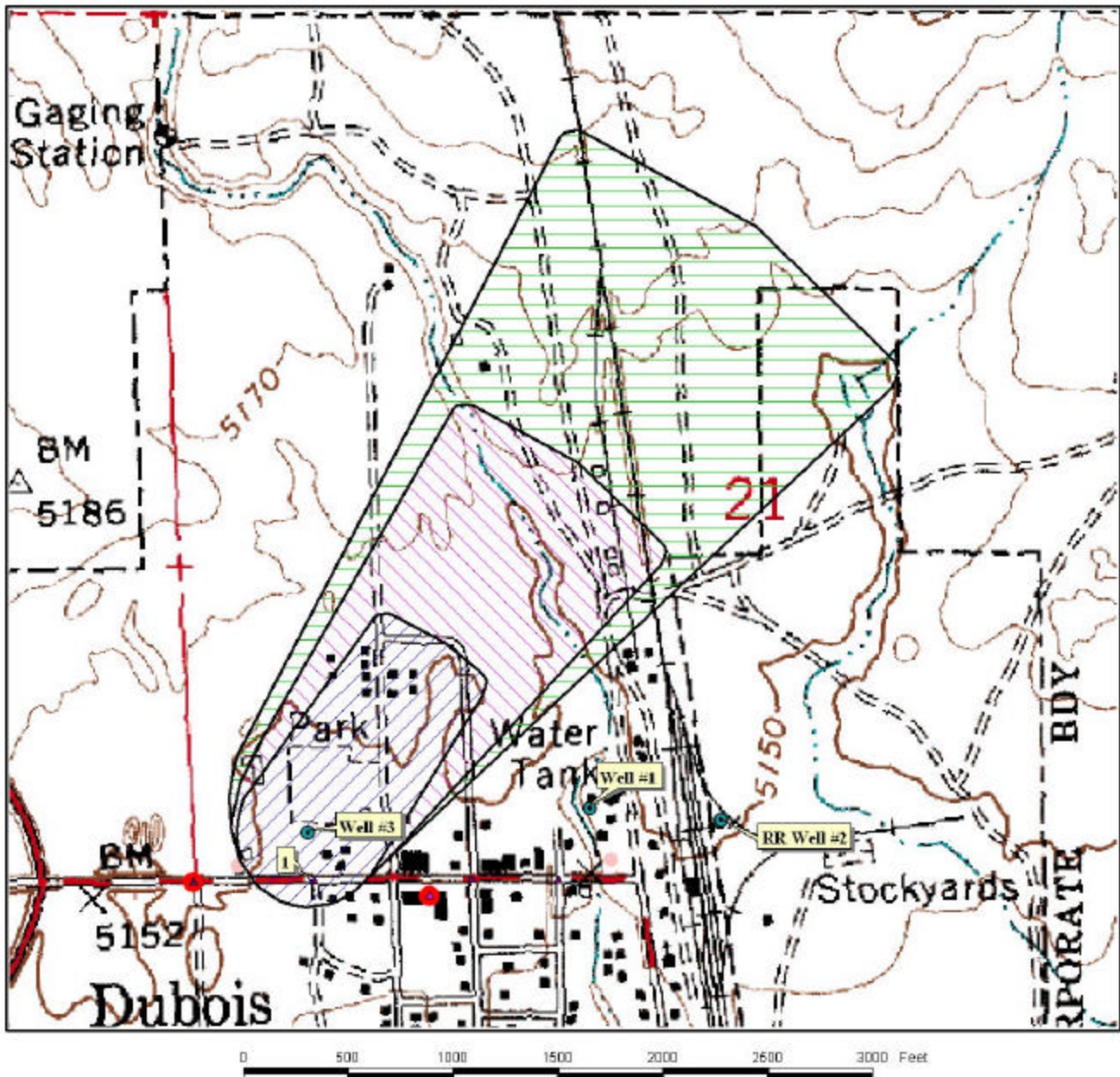
**FIGURE 3 - City of Dubois Delineation Map and Potential Contaminant Source Locations**



**PWS# 7170003**  
**RR Well #2**



**FIGURE 4 - City of Dubois Delineation Map and Potential Contaminant Source Locations**



**PWS# 7170003**  
**Well #3**

## Appendix B

### City of Dubois Well Susceptibility Analysis for Wells #1, #2 & #3

1. System Construction

Drill Date	1/1/1921	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	1998
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		4

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	YES	0
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		5

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	3	3	3	2
(Score = # Sources X 2 ) 8 Points Maximum		6	6	6	4
Sources of Class II or III leacheable contaminants or	YES	2	3	2	
4 Points Maximum		2	3	2	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		8	9	8	4
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		15	16	15	6

4. Final Susceptibility Source Score

12 12 12 11

5. Final Well Ranking

Moderate Moderate Moderate Moderate

1. System Construction

Drill Date	2/18/1921	
Driller Log Available	NO	
Sanitary Survey (if yes, indicate date of last survey)	YES	1998
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		4

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	YES	0
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		5

3. Potential Contaminant / Land Use - ZONE 1A

Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2

Potential Contaminant / Land Use - ZONE 1B

Contaminant sources present (Number of Sources)	YES	2	2	2	2
(Score = # Sources X 2 ) 8 Points Maximum		4	4	4	4
Sources of Class II or III leacheable contaminants or	YES	2	2	2	
4 Points Maximum		2	2	2	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		6	6	6	4

Potential Contaminant / Land Use - ZONE II

Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0

Potential Contaminant / Land Use - ZONE III

Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		0	0	0	0

Cumulative Potential Contaminant / Land Use Score

11 11 11 6

4. Final Susceptibility Source Score

11 11 11 11

5. Final Well Ranking

Moderate Moderate Moderate Moderate

1. System Construction

Drill Date	5/29/68	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	1998
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
Total System Construction Score		4

2. Hydrologic Sensitivity

Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2
Total Hydrologic Score		6

		IOC Score	VOC Score	SOC Score	Microbial Score
3. Potential Contaminant / Land Use - ZONE 1A					
Land Use Zone 1A	URBAN/COMMERCIAL	2	2	2	2
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	2	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	2	2	2	1
(Score = # Sources X 2 ) 8 Points Maximum		4	4	4	2
Sources of Class II or III leacheable contaminants or	YES	2	2	1	
4 Points Maximum		2	2	1	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		6	6	5	2
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		13	13	12	4
4. Final Susceptibility Source Score		13	13	12	12
5. Final Well Ranking		High	High	Moderate	Moderate